



IN THE SPECIFICATION

Please amend page 1 lines 3-16 as follows:

The present invention relates to a gel processing and transfer device. The device ensures un-damaged, intact gel while performing all the steps with agarose gel or the like that are involved after electrophoresis of nucleic acids or the like and before placing the gel onto the membrane for the purpose of transfer of nucleic acids or the like. Importantly, **apparatus the device** ensures un-damaged, intact gel during transfer and transportation of the gel from the device onto the membrane or like. The present invention also describes the method to use the **apparatus device**.

BACKGROUND AND PRIOR ART REFERENCES

One of the ways to separate macromolecules such as proteins, nucleic acids, charged sugars and peptides etc. is through electrophoresis wherein, electrical voltage is applied to the moieties to be separated, and these move with different velocities in a solution depending upon their charge, size, shape and viscosity of the medium. To disallow diffusion of the macromolecules in solution due to convection currents, the solution is supported on a porous matrix.

Please amend page 2, line 10 to page 3, line 19 as follows:

In southern blotting, deoxyribonucleic acid (hereinafter known as DNA) is digested with endonucleases followed by electrophoretic separation of the digested fragments on agarose gel and finally transfer of the digested DNA onto a membrane. To ease transfer of large-sized DNA from the gel onto the membrane, DNA strands need to be (i) cleaved using 0.25 M hydrochloric acid, (ii) denatured using 1.5 N sodium chloride/ 0.5 N sodium hydroxide to obtain single **strand strands**, and (iii) neutralized using 1.5 N sodium chloride/ 0.5 N tris-chloride (pH, 7.0) to allow proper binding of DNA onto the membrane onto which the transfer has to take place. After achieving these steps of processing, the gel needs to be placed onto a membrane to allow transfer of DNA from the gel onto the membrane (Ausubel, F. M., Brent, R., Kingston, R. E., Moore, D. D., Seidman, J. G., Smith, J. A. and Struhl, K. 1998. Current protocols in molecular biology. John Wiley & Sons, Inc. New York, pp. 2.8.1- 2.9.15).

In northern blotting, ribonucleic acid (hereinafter known as RNA) is run on agarose gel that usually contains formaldehyde. For efficient transfer of RNA from the gel onto the

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membrane, RNA containing gel needs to be (i) washed several times with water, (ii) denatured using 1.5 N sodium chloride/ 0.05 N sodium hydroxide, (iii) neutralized using 1.5 N sodium chloride/ 0.5 N tris-chloride (pH, 7.4), **and** (iv) soaked in 20 x SSC (3 M sodium chloride, 0.3 M sodium citrate; adjust pH to 7.0 with 1 M hydrochloric acid). After achieving these steps of processing, the gel needs to be placed onto a membrane to allow transfer of RNA from the gel onto the membrane (Ausubel, F. M., Brent, R., Kingston, R. E., Moore, D. D., Seidman, J. G., Smith, J. A. and Struhl, K. 1998. Current protocols in molecular biology. John Wiley & Sons, Inc. New York, pp. 4.9.1-4.9.16).

These processes are normally carried out in containers which are normally a baking dish or in a plastic box (Sambrook, J., Fritsch, E. F. and Maniatis T. 1989. Molecular cloning: A laboratory manual. 2nd Ed. Cold Spring Harbour Laboratory Press. New York; Ausubel, F. M., Brent, R., Kingston, R. E., Moore, D. D., Seidman, J. G., Smith, J. A. and Struhl, K. 1998. Current protocols in molecular biology. John Wiley & Sons, Inc. New York). While changing various solutions as mentioned in the above paragraph, the container is tilted to remove the solution. The gel needs to be held by hand to avoid falling of the gel along with the solution. Secondly, after giving various washes with different solutions as mentioned in the above paragraph, the gel has to be taken out from the container to be placed over the membrane. This second process leads to the damage of the delicate gel. Also, the gel has to be placed onto the membrane properly, and once **[[kept]] placed** onto the membrane, the gel can not be moved.

Please amend page 4, lines 3-12 as follows:

Also, while working with proteins, the staining of the proteins requires several solutions to be changed one after another and once the proteins are stained, the photography of the gel is essential to record the data (Hames, B. D. 1990. One dimensional polyacrylamide gel electrophoresis. *In* Gel electrophoresis of proteins: A practical approach. (Hames, B. D. and Rickwood, D., eds.) 2nd Ed. IRL Press at Oxford University Press, Oxford. pp. 1-147). This also dictates the development of such device, wherein intactness of the gel should be ensured during staining protocols, and the device should be capable of presenting the gel for the purpose of photography.

Such a device could not be found with various firms dealing with laboratory products. The **catalogue catalogues** of the following firms were scanned:

Please amend page 4, line 20 to page 5, line 6 as follows:

- (e) Brand GMBH + CO KG, Laboratory Equipment Manufactures, P. O. Box 1155 D-97861, Wertheim, Germany.
- (f) Sigma Chemical Co., P. O. Box 14508, St. Louis, MO 63178 USA.
- (g) Gibco BRL Life Technologies, 9880 Medical Centre Drive, P. O. Box 6482, Rockville, MD 20849-648.
- (h) Consort Ltd., Parklaan 36 B-2300, Turnhout, Belgium.
- (i) Bio-Rad Laboratories, 2000 Alfred Nobel Drive, Hercules, California 94547.
- (j) S. D. Fine-Chem Ltd., 315-317, T.V. Industrial Estate, 248 Worli Road, Mumbai 400025 India.
- (k) Tarsons Products Pvt. Ltd., 856 Marshall House, 33/1 Netaji Subash Road, Calcutta 700001 India.

Please amend page 5, line 15 to page 6, line 10 as follows:

1. The product can accommodate a limited-sized gel; **and**
2. The gel is broken during transfer from the product onto a blotter.

Since the Product number Z 35,829-0 and Z 35,830-4 by M/s Sigma Chemical Co, USA is also similar to the one by M/s. Tarsons Products Pvt. Ltd., India (product number 482030) apart from the size, **the** end result is likely to be the same.[]]]

Thus, there is no gel processing and transfer device that ensures intact gel (i) during various processes that are involved after electrophoresis of nucleic acids and before placing the gel onto the membrane for the purpose of transfer of nucleic acid, and (ii) during transfer of the gel from the device onto the membrane. The patent search has been conducted to survey the existing patents relating to the use of processing and transfer of gels. The critical study of the prior patents indicates that none of them **[[is]] are**, somehow, not at all connected to the type of applications the present invention is intended to. A new device ~~which is being planned to be launched by the applicant~~ would be a service through which users would be accessed to a device which will help processing and transfer of gels with minimal handling. This ~~object of invention~~ **device** would be the first of its kind.

OBJECTS OF THE INVENTION

The main objects of the present invention **[[is]] are** to provide a gel processing and transferring device.

Another object of the present invention is to provide a gel processing device which requires ~~[[least]]~~ **minimal** handling.

Please amend page 6, lines 17-23 as follows:

Figure 2 represents the base plate, ~~one embodiment~~ of the device, which has a drain-out facility for solution.

Figure 3 represents the drain-out facility for solution in the base plate, ~~another embodiment~~ of the device.

Figure 4 represents the retaining rim, ~~an preferred embodiment~~ of the **apparatus device of the present** invention.

Figure 5 represents the lid, ~~yet another embodiment~~ of the **apparatus device of the present** invention.

Please amend page 7, lines 1-13 as follows:

Figure 7 represents the transfer of gel from the electrophoresis tray onto **the** base plate of the device.

Figure 8 represents the processing of the gel in the ~~invented~~ device. The covering lid is not shown in ~~the photograph~~ **Figure 8**.

Figure 9 represents transfer of the gel from **the** base plate of the device to a vacuum blotter.

DETAILED DESCRIPTION OF THE INVENTION

Accordingly, the invention presents a gel processing and transfer device, useful for the processing and transferring of ~~[[the]]~~ gels with minimal handling, comprising ~~[[of]]~~ at least four separable components namely, (i) a base plate for holding the gels with the facility to drain out solution, (ii) a retaining rim ~~with attached side walls, said side walls are~~ fastened to the base plate by a fastening means, (iii) at least one "O" ring fixed to the retaining rim to give leakproof arrangement, and (iv) a lid to cover the **assembly retaining rim fastened to the base plate**.

Please amend page 7, lines 17-20 as follows:

In another embodiment of the present invention, the base plate used is made up of materials selected from the group comprising ~~[[of,]]~~ polycarbonate, acrylic, plexiglas, glass, plastic, polyethylene, polypropylene, polyester, polymethacrylate, poly(1,4-cyclohexylene dimethylene terephthalate)glycol and metals.

Please amend page 7, lines 23-25 as follows:

In yet another embodiment of the present invention, one of the ends of the base plate can optionally be shaped in the form of a wedge to ease transfer of the gel from the base plate onto the membrane.

Please amend page 8, lines 3-10 as follows:

In ~~[[one]]~~ another embodiment of the present invention, the drain-out device has a hole cut in the center ~~[[on]]~~ of one side of the base plate.

In an embodiment of the present invention, the hole of the drain-out device has a nozzle attached thereto ~~cut to fit the size of the object of invention~~.

In another embodiment of the present invention, the nozzle on the drain-out device is made up of materials selected from the group comprising ~~[[of,]]~~ polycarbonate, acrylic, plexiglas, glass, plastic, polyethylene, polypropylene, polyester, polymethacrylate, poly(1,4-cyclohexylene dimethylene terephthalate)glycol and metals.

Please amend page 8, line 13 to page 9, line 4 as follows:

In one more embodiment of the present invention, the tube is made up of materials selected from the group comprising ~~[[of,]]~~ rubber, latex rubber, silicone, platinum-cured silicone (for high purity and no peroxides), C-Flex (an opaque white thermoplastic elastomer formulated from styrene-ethylene-butadiene-styrene block co-polymer, low density polyethylene, fluorinated ethylene-propylene, teflon polytetrafluoroethylene and silicone.

In ~~[[one]]~~ another embodiment of the present invention, the tube may be of any convenient length and with an inner diameter that fits exactly to the open end of the nozzle and fixed with a clamp to control the flow of the solution.

In an embodiment of the present invention, the base plate can have any type of ~~[[the]]~~ drain out facility to decant the poured solution.

In still another embodiment of the present invention, the retaining rim has ~~dimension~~ dimensions depending upon the size of the gel used.

In yet another embodiment of the present invention, the retaining rim is made up materials selected from the group consisting of~~[[,]]~~ polycarbonate, acrylic, plexiglas, glass, plastic, polyethylene, polypropylene, polyester, polymethacrylate, poly(1,4-cyclohexylene dimethylene terephthalate)glycol and metals.

Please amend page 9, lines 7-14 as follows:

In **[[one]]** another embodiment of the present invention, the retaining rim has ~~sidewalls~~ side walls of a height of at least 1 cm.

In an embodiment of the present invention, the ~~sidewalls~~ side walls of the retaining rim are attached perpendicular to horizontal plates and ~~2 cm wide from the horizontal plates~~ are attached to ensure that the horizontal plates are always outside the ~~sidewalls~~ side walls.

In another embodiment of the present invention, the ~~sidewalls~~ side walls of the retaining rim are attached with the horizontal plate in a way so that 2 mm of ~~the side walls~~ side walls always protrude below the horizontal plate.

Please amend page 9, line 17 to page 11, line 9 as follows:

In yet another embodiment of the present invention, the fastening mechanism **[[are]]** is selected from the group comprising **[[of]]** nut and bolts, clamps, bolts with plastic fitted caps and nuts engraved in the base plate.

In one more embodiment of the present invention, the fastening mechanism ~~as used,~~ is selected from the material group comprising ~~of the group~~ acrylic, plexiglas, glass, plastic, polyethylene, polypropylene, polyester, polymethacrylate, poly(1,4-cyclohexylenedimethyleneterephthalate) glycol and metals.

In **[[one]]** another embodiment of the present invention, the retaining rim **[[used]]** has at least one "O" ring to avoid leakage of solution from the assembly of the base plate and the retaining rim.

In an embodiment of the present invention, the "O" ring is made up of materials selected from the group comprising **[[of]]** rubber, latex rubber, silicone, platinum-cured silicone (for high purity and no peroxides), C-Flex (an opaque white thermoplastic elastomer formulated from styrene-ethylene-butadiene-styrene block co-polymer), low density polyethylene, fluorinated ethylene-propylene, teflon polytetrafluoroethylene and silicone.

In another embodiment of the present invention, the "O" ring **[[used]]** is fitted around the protruded portion of the ~~sidewalls~~ side walls of the retaining rim.

In still another embodiment of the present invention, the "O" ring **[[used]]** can optionally be placed inside ~~the groove~~ a groove of the base plate.

In yet another embodiment of the present invention, the lid **[[used]]** depends upon the size of the assembly made by the ~~sidewalls~~ side walls of the retaining rim.

In one more embodiment of the present invention, the lid **[[used]]** is made up of **[[the]]** materials selected from the group comprising **[[of]]** polycarbonate, acrylic, plexiglas, glass, plastic, polyethylene, polypropylene, polyester, polymethacrylate, poly(1,4-cyclohexylene dimethylene terephthalate)glycol and metals.

In **[[one]]** another embodiment of the present invention, the lid **[[used]]** has a thickness of at least 1 mm.

In an embodiment of the present invention, the lid rests on the top of ~~sidewalls~~ side walls of the retaining rim and can be easily covered and removed.

In another embodiment of the present invention, the lid ~~as-used~~ has ~~atleast~~ at least four protrusions attached onto the top, that keep the lid fixed~~[[,]]~~ onto the side walls of the retaining rim from outside and the dimension of which depend upon the height of the side walls of the retaining rim.

In still another embodiment of the present invention, the protrusions in the lid ~~as-used, is selected~~ are made from the material~~[[,]]~~ selected from the group consisting of~~[[,]]~~ polycarbonate, acrylic, plexiglas, glass, plastic, polyethylene, polypropylene, polyester, polymethacrylate, poly(1,4-cyclohexylene dimethylene terephthalate)glycol or metal of choice, but is not limited to the said group.

In yet another embodiment of the present invention, the protrusions on the lid~~[[, has]]~~ have a thickness of at least 1mm.

Please amend page 11, lines 12-15 as follows:

In **[[one]]** another embodiment of the present invention, the whole unit or individual components~~[[,]]~~ could be a part of the automation unit leading to robotic-gel-transfer.

In an embodiment of the present invention, the **[[said]]** device ensures intact gel during different processes involved after electrophoresis and during transportation.

Please amend page 11, line 18 to page 15, line 6 as follows:

In still another embodiment of the present invention, the device constructed with metal with no heat-sensitive component has uses in the food industry and particularly will be useful to bake cake, bread and/or the like with no damage to the product.

In yet another embodiment of the present invention, the device is used in giving desired shape to the jelly and/or **[[the]]** like material.

In one more embodiment of the present invention, the device is transparent to various lights, translucent, opaque, or impermeable to light ~~or the like material~~.

The following example is given by the way of illustration of the device of the present invention, and it should not be construed to limit the scope of the present invention.

EXAMPLE 1

GENERAL METHOD FOR CONSTRUCTION OF THE DEVICE

The present invention provides ~~with an apparatus~~, a gel processing and transfer device, that consists of at least four separable components. In figure 2[[.]] of the drawings ~~accompanying this specification~~, the base plate (1) of the device of the present invention is depicted. The base plate (1) of the device has a nozzle (2) attached to the rectangular hole (3). A silicone ~~tubing~~ tube (4) along with a clamp (5) is fixed onto the open end of the nozzle (2). In figure 6[[.]] of the drawings ~~accompanying this specification~~, an arrangement of the various components of the device is shown. Retaining rim (6) of the device is attached to the base plate (1) using nuts and bolts (7). Holes (8) are drilled on the outer edge of the base plate (1) and the retaining rim (6) for fastening nuts and bolts (7). The retaining rim (6) has four side walls (9) joined perpendicularly to the horizontal plate (10) in such a way that the side walls (9) protrude below the horizontal plate (10). A rubber strip (11) is fixed outside the ~~protrusion~~ protruded portion on the lower side of the horizontal plate (10). An "O" ring (12) is placed in the ~~room~~ space created by the ~~protrusion~~ protruded portion of the side walls (9) and the horizontal plate (10) of the retaining rim (6).

After fastening the base plate (1) and the retaining rim (6), a lid (13) is placed over the side walls (9) of the retaining rim (6). The lid (13) remains fixed onto the assembly with the help of at least four protrusions (14) attached to the lid (13).

EXAMPLE 2

PREPARATION OF THE BASE PLATE

The base plate (1) was prepared using a 2 mm thick polycarbonate sheet, cut with the help of a hexagonal blade, exactly measuring to a size of 28 x 22 cm. To give strength to the edges of the base plate (1), a 2 cm wide and 2 mm thick polycarbonate sheet is glued using chloroform (organic solvent), to the base plate (1). A drain out facility is made in the base plate (1) by making a 0.5 x 0.5 cm hole (3) on the 28 cm long side of the base plate (1) at a distance of 11 cm from one end of the length. Width-wise, the hole (3) is placed at a distance of 19.5 cm

from one end of the 22 cm wide base plate (1). To the hole (3), a small nozzle (2) measuring 4.5 cm is attached. The nozzle (2) is prepared with ~~[[the]]~~ pieces of 2 mm thick polycarbonate sheet, cut to fit the size. To the nozzle (2), a silicone tube (4), 30 cm in length, exactly fitting to the open end of the nozzle (2) (with inner diameter of 0.6 cm), is attached. A clamp (5) is placed onto the silicone tube (4) to control the flow of solution.

To fasten the base plate~~[[,]]~~ (1) to the retaining rim~~[[;]]~~ (6), holes (8) (diameter 1 cm) are drilled on the base plate (1), at a distance of 1 cm from the outer edge in both the directions. A total of 5 holes (8) are drilled on the side measuring 28 cm and a total of 4 holes (8) are drilled on the side measuring 22 cm. The holes (8) at the corners are common on length and width-wise.

EXAMPLE 3

PREPARATION OF THE RETAINING RIM

The retaining rim (6) of the ~~object of present~~ invention is prepared using a 2 mm thick polycarbonate sheet measuring 28 x 22 cm in outer dimension. The inner plate of 24 x 18 cm was cut and removed from the overall plate to give a gasket of polycarbonate. A similar gasket was cut from a different plate and glued onto the first to give additional strength to the horizontal plate (10) of the retaining rim (6). The side walls (9) of retaining rim (6) are made from a single 84 cm long and 4 cm wide piece of 2 mm thick polycarbonate, bent at 3 corners at an angle of 90° to obtain a rectangular structure. The side walls (9) of retaining rim (6) thus formed ~~brings~~ bring two free ends of the polycarbonate piece together to allow joining. The ~~side-walls~~ side walls (9) of the retaining rim (6) [[is]] are attached perpendicularly to the 2 cm wide horizontal plates (10) in such a way that the horizontal plates (10) are always outside the side walls (9) of the retaining rim (6). Attachment of the side-walls side walls (9) of the retaining rim (6) with the horizontal plate (10)~~[[,]]~~ is performed in such a way that 2 mm of the side-walls side walls (9) always protrude below the horizontal plate (10). This arrangement gives an effective height of 4.2 cm to the retaining rim (6).

After fastening the nuts and bolts (7) to the retaining rim (6) and the base plate (1), the assembly looks like an open rectangular box that forms an enclosure offering an effective space of 24 x 18 cm onto the base plate (1).

EXAMPLE 4

PREPARATION OF NO-SOLUTION-LEAK SYSTEM

To check the leakage from the ~~apparatus device~~, a rubber "O" ring (12) (4 millimeters thickness) is placed under the horizontal plate (10) of the retaining rim (6). The "O" ring (12) is placed in the space provided by the ~~protrusion~~ protruded portion of ~~the~~ side walls (9) to the horizontal plates (10) of the retaining rim (6). Since the horizontal plate (10) of the ~~[[side]]~~ retaining rim (6) actually sits on the base plate (1), the placing of an "O" ring (12) on the retaining rim (6) creates a gap, which may lead to damage of ~~the~~ horizontal plates (10) during fastening with nut and bolts (7). To avoid this, a rubber strip (11) of 1.5 mm thickness was fixed around the "O" ring (12) on the retaining rim (6). Such an arrangement resulted into a "no-solution-leak" system.

EXAMPLE 5

PREPARATION OF THE LID

The lid (13) is an important component of the ~~object-of present~~ invention and provides safety to the gel and to the solution ~~in the object-of invention~~. Also, it will check evaporation of solutions from the device.

The lid (13) measuring 24 x 18 cm is constructed using a 2 mm thick polycarbonate sheet. To avoid slipping of the lid (13) from top of the retaining rim, a 2.5 cm long and 4.0 cm wide protrusion (14) made with polycarbonate is fixed onto the top of the lid (13). The protrusion (14) covers the retaining rim from ~~out-side~~ the outside and fixes the lid (13) on to the side walls (9) of the retaining rim (6) in the complete assembly. A folded piece of polycarbonate was fixed in the center of the lid (13) to give a handle for ~~the~~ lid (13) and eases its movement.

Please amend page 15, line 11 as follows:

- (xi) Autoclave the complete assembly of the ~~[[object]]~~ device of the present invention.

Please amend page 15, lines 15-20 as follows:

- (iv) Remove the lid (13) of the device and keep aside.
- (v) Remove retaining rim (6) of the device by unscrewing nut and bolts (7).
- (vi) Base plate (1) is now exposed and is ready to accept the gel.
- (vii) Bring the tray containing gel to be transferred on the top of ~~the~~ base plate (1).
- (viii) While holding the gel tray with both the hands, tilt the tray from the front and bring it very close (almost touching) to the base plate (1).

Please amend page 15, line 24 to page 16, line 4 as follows:

- (xi) After a few seconds, the gel from the gel tray will be transferred onto the base plate (1).
- (xii) Place the retaining rim (6) onto the base plate (1).
- (xiii) Fasten the retaining rim (6) with the help of nut and bolts (7).
- (xiv) Ensure that the clamp (5) on the drain-out tube (4) is tight enough to avoid leakage of any solution.

Please amend page 16, lines 6-9 as follows:

- (xvi) As per the need, the whole ~~[[of the]]~~ assembly may be ~~[[kept]]~~ placed over a shaker.
- (xvii) To remove the poured solution, the clamp (5) on the drain-out ~~[[pipe]]~~ tube (4) should be loosened.
- (xviii) Once~~[[,]]~~ the solution is drained out, fasten the clamp (5) and pour the solution.

Please amend page 16, line 11 to page 17, line 2 as follows:

- (xx) Cover and uncover the lid (13) as and when required.
- (xxi) Once the processing is over, remove the lid (13).
- (xxii) Remove ~~[[nut]]~~ nuts, bolts (7) or any fastening mechanism.
- (xxiii) Remove retaining rim (6).
- (xxiv) Take the base plate (1) containing the gel near to a blotter.
- (xxv) Position the base plate (1) onto the blotter where the gel has to be transferred.
- (xxvi) While holding the base plate (1) with both hands, tilt the base plate (1) from the front and bring it very close (almost touching) to the place where the gel needs to be transferred.
- (xxvii) While holding the base plate (1), give light push to the gel with the help of thumb. It is also possible to hold the base plate (1) with one hand and use another hand to push the gel slowly for its transfer onto the blotting surface.
- (xxviii) Concomitantly, the base plate (1) should be pulled away from the gel.
- (xxix) After a few seconds, the gel from the base plate (1) stands transferred onto the blotting surface.

Please amend page 17, lines 6-22 as follows:

- (a) Bring the device near the photography unit.

- (b) Uncover the lid (13).
 - (c) Remove the solution from the **apparatus device**.
 - (d) During draining out of the solution, ensure that the gel is properly spread.
 - (e) Remove the retaining rim (6) as in steps (xxii) and (xxiii) above.
 - (f) Since the base plate (1) is a transparent surface, the photography can easily be performed.
- (xv) During processing of the gel, the drain-out tube (4) can easily be fitted tightly in the space between nut and bolt (7) and the side walls (9) of the retaining rim (6).

THE MAIN ADVANTAGES OF THE PRESENT INVENTION [[ARE]]

The invention provides a gel processing and transfer device wherein both ~~[[the]]~~ features ~~that is, of~~ the processing and the transfer capabilities are present in the same device. The device ~~[[that]]~~ ensures intact gel during various processes that are involved after electrophoresis of nucleic acids and before placing the gel onto the membrane for the purpose of transfer of nucleic acid, and while transferring the gel from the device onto the membrane.

The ~~elaimed~~ device has the following characteristics and uses:

Please amend page 18, lines 5-7 as follows:

- e. safe system for gel transportation from one place to another ~~for the purpose~~ such as, but not limited to, for taking permanent impressions of the gel for records.